What is Claimed is:

1. A method for processing a substrate in a processing chamber, comprising:

positioning the substrate in a processing chamber;

introducing a processing gas into the processing chamber, wherein the processing gas comprises one or more hydrocarbon compounds and an argon carrier gas;

generating a plasma of the processing gas by applying power from a dual-frequency RF source; and

depositing an amorphous carbon layer on the substrate.

2. The method of claim 1, further comprising etching the amorphous carbon layer to form a patterned amorphous carbon layer.

3. The method of claim 1, wherein the one or more hydrocarbon compounds have the general formula C_xH_y, wherein x has a range of 2 to 4 and y has a range of 2 to 10.

4. The method of claim 3, wherein the one or more hydrocarbon compounds are selected from the group consisting of propylene (C_3H_6), propyne (C_3H_4), propane (C_3H_8), butane (C_4H_{10}), butylene (C_4H_8), butadiene (C_4H_6), acetelyne (C_2H_2), and combinations thereof.

5. The method of claim 1, further comprising removing the amorphous carbon layer from the substrate using a hydrogen-containing plasma, an oxygen-containing plasma, or combination thereof.

6. The method of claim 3, wherein the generating the plasma comprises applying a first RF power at a first frequency and applying a second RF power at a second frequency less than the first frequency.

7. The method of claim 6, wherein the generating the plasma comprises applying a first RF power between at a first frequency between about 10 Mhz and

about 30 Mhz applying a second RF power at a second frequency between about 100kHz and about 500KHz.

8. The method of claim 6, wherein the ratio of second RF power to first RF power is less than about 0.6:1.

9. A method for processing a substrate in a processing chamber, comprising:

forming a dielectric material layer on a surface of the substrate;

depositing one or more amorphous carbon layers on the dielectric material layer by a process comprising:

introducing a processing gas comprising one or more hydrocarbon compounds and an argon carrier gas;

generating a plasma of the processing gas by applying power from a dual-frequency RF source;

etching the one or more amorphous carbon layers to form a patterned amorphous carbon layer; and

etching feature definitions in the dielectric material layer corresponding to the patterned one or more amorphous carbon layers.

10. The method of claim 9, further comprising:

removing the one or more amorphous carbon layers; and

depositing a conductive material on the surface of the substrate.

11. The method of claim 9, further comprising:

depositing an anti-reflective coating on the one or more amorphous carbon layers; and

patterning resist material on the anti-reflective coating; and

etching the anti-reflective coating prior to or concurrent with etching the one or more amorphous carbon layers.

12. The method of claim 9, wherein the hydrocarbon compound has the general formula C_xH_y, wherein x has a range of 2 to 4 and y has a range of 2 to 10.

13. The method of claim 12, wherein the one or more hydrocarbon compounds are selected from the group consisting of propylene (C_3H_6), propyne (C_3H_4), propane (C_3H_8), butane (C_4H_{10}), butylene (C_4H_8), butadiene (C_4H_6), acetelyne (C_2H_2), and combinations thereof.

14. The method of claim 9, wherein the generating the plasma comprises applying a first RF power at a first frequency and applying a second RF power at a second frequency less than the first frequency.

15. The method of claim 14, wherein the generating the plasma comprises applying a first RF power between at a first frequency between about 10 Mhz and about 30 Mhz applying a second RF power at a second frequency between about 100kHz and about 500KHz.

16. The method of claim 9, wherein the ratio of second RF power to first RF power is less than about 0.6:1.

17. The method of claim 9, wherein at least one of the one or more amorphous carbon layers comprise an anti-reflective coating.

18. The method of claim 11, wherein the anti-reflective coating is a material selected from the group of silicon nitride, silicon carbide, carbon-doped silicon oxide, amorphous carbon, and combinations thereof.

19. The method of claim 9, further comprising depositing a barrier layer prior to depositing the dielectric material.

20. The method of claim 11, further comprising removing the resist material prior to etching feature definitions in the dielectric layer.

21. The method of claim 9, wherein the etch selectivity of amorphous carbon to

the dielectric material is greater than about 1:10.

22. A method for processing a substrate, comprising:

depositing one or more dielectric layers on a substrate surface, wherein the one or more dielectric layers comprise silicon, oxygen, and carbon and has a dielectric constant of about 3 or less;

forming one or more amorphous carbon layers on the one or more dielectric layers by a process comprising:

introducing a processing gas comprising one or more hydrocarbon compounds and an argon carrier gas;

generating a plasma of the processing gas by applying power from a dual-frequency RF source;

defining a pattern in at least one region of the one or more amorphous carbon layers;

forming feature definitions in the one or more dielectric layers by the pattern formed in the at least one region of the one or more amorphous carbon layers; and

depositing one or more conductive materials in the feature definitions.

23. The method of claim 22, further comprising removing the one or more amorphous carbon layers by exposing the one or more amorphous carbon layers to a plasma of a hydrogen-containing gas prior to depositing one or more conductive materials in the feature definitions.

24. The method of claim 23, wherein the hydrogen-containing gas comprises a gas selected from the group of hydrogen, ammonia, water vapor, and combinations thereof.

25. The method of claim 23, wherein the plasma is generated by applying a power level between about 0.15 watts/cm^2 and about 5 watts/cm^2 to the chamber between for between about 10 seconds and about 120 seconds.

26. The method of claim 22, further comprising:

polishing the one or more conductive materials and stopping on the one or more amorphous carbon layers; and

removing the one or more amorphous carbon layers by exposing the one or more amorphous carbon layers to a plasma of a hydrogen-containing gas.

27. The method of claim 22, further comprising:

depositing an anti-reflective coating on the one or more amorphous carbon layers; and

patterning resist material on the anti-reflective coating; and

etching the anti-reflective coating prior to or concurrent with etching the one or more amorphous carbon layers.

28. The method of claim 22, wherein the hydrocarbon compound has the general formula C_xH_y, wherein x has a range of 2 to 4 and y has a range of 2 to 10.

29. The method of claim 28, wherein the one or more hydrocarbon compounds are selected from the group consisting of propylene (C_3H_6), propyne (C_3H_4), propane (C_3H_8), butane (C_4H_{10}), butylene (C_4H_8), butadiene (C_4H_6), acetelyne (C_2H_2), and combinations thereof.

30. The method of claim 28, wherein the one or more hydrocarbon compounds further comprises one or more fluorinated derivatives of the one or more hydrocarbon compounds.

31. The method of claim 22, wherein the generating the plasma comprises applying a first RF power at a first frequency and applying a second RF power at a second frequency less than the first frequency.

32. The method of claim 31, wherein the generating the plasma comprises applying a first RF power between at a first frequency between about 10 Mhz and about 30 Mhz applying a second RF power at a second frequency between about 100kHz and about 500KHz.

33. The method of claim 31, wherein the ratio of second RF power to first RF power is less than about 0.6:1.

34. The method of claim 27, wherein the anti-reflective coating is a material selected from the group of silicon nitride, silicon carbide, carbon-doped silicon oxide, amorphous carbon, and combinations thereof.

35. The method of claim 22, further comprising depositing a barrier layer prior to depositing the at least one dielectric material.

36. The method of claim 22, wherein the etch selectivity of amorphous carbon to the dielectric material is greater than about 1:10.

37. The method of claim 27, wherein at least one of the one or more amorphous carbon layers comprise an anti-reflective coating.